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Patterns of Healthcare Access and Utilization among Nonurban Transgender and Nonbinary Patients at a Large Safety Net Health System in Colorado

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Current research characterizing transgender and nonbinary (TNB) communities focuses on coastal, urban centers and inadequately recognizes intersections of geography and gender identity. This study evaluates demographics, health insurance, mental health, one-way distance to care, and types of care accessed for a cohort of nonurban TNB patients seeking care at a large, safety net health system in Denver, Colorado. Electronic medical record (EMR) data were used to identify this TNB patient cohort (n = 1,230) Characteristics of age, race/ethnicity, sex assigned at birth, gender identity, insurance, residence ZIP code, alcohol use disorder, tobacco use, marijuana use, depression, and anxiety were extracted. Chart review characterized utilization patterns among non-Denver TNB patients (n = 232). Denver TNB patients were more likely to have the following characteristics: black or Hispanic identity, marijuana use, commercial insurance, depression, anxiety; comparatively, non-Denver TNB patients were more likely to be white and have public insurance coverage. The non-Denver cohort traveled an average of 82.52 miles one-way. A majority of non-Denver patients accessed gender-affirming (99%), hormone-related (81%), primary (78%), and preventive (69%) care. A minority of these patients (23%) accessed surgical transition care. Proximity to care is one of many important factors for TNB patients seeking care. The number of non-Denver TNB traveling for healthcare likely reflects a lack of accessibility to local gender-affirming care, which should prompt nonurban medical providers to seek training that meets this need. Medical educators should improve teaching on gender-affirming healthcare, particularly for rural educational tracks.

Keywords: transgender persons; gender identity; gender minorities; rural health; healthcare quality, access, and evaluation; urban health

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STATEMENT OF PUBLIC HEALTH SIGNIFICANCE

Transgender and nonbinary populations consistently report lack of access as a barrier to health care; consequently, this study seeks to characterize and describe health care utilization patterns among this community, with special focus on patients bypassing geographically proximal care in order to access gender-affirming care in Denver, Colorado.

INTRODUCTION

Transgender and nonbinary (TNB) populations include individuals whose gender identity does not align with their sex assigned-at-birth and consistently report lack of access as a barrier to healthcare.[1–3] Access for TNB populations is impacted by lack of insurance coverage, financial barriers, cost of care, unemployment, experience of discrimination and stigma, verbal and physical harassment, and refusal of care among providers.[4–9] However, specific lack of access to safe and affirming providers, with sufficient education about TNB healthcare, represents the single largest component inhibiting access to both gender affirming and broader comprehensive care.[1,4,10,11] As a result, TNB populations often avoid or delay seeking healthcare,[12] which, when combined with pervasive societal stigma and discrimination, contributes to numerous health disparities, such as disproportionately elevated rates of suicide, anxiety, depression,[13,14] alcohol and substance use,[8,14–16] HIV,[17] and more emergency department visits when compared to cisgender populations (those who identify with their sex assigned-at-birth).[18]

Despite prior research showing it is common for TNB populations to travel to nearby cities or outside of the United States to find affirming providers,[4,19] evidence regarding utilization patterns and travel distance to care for TNB populations is limited. In an analysis of the 2015 U.S. Transgender Survey data, nearly one-third of all respondents reported traveling ≥25 miles to receive gender-affirming care, with half of those traveling ≥50 miles; meanwhile, 89% of respondents travel <25 miles for routine medical care unrelated to gender.[20] For respondents residing in rural areas, two-thirds report traveling ≥25 miles and about one-fourth travel this distance or more for routine care.[20]Multiple reports calculate that the average, nonurban, cis patient travels about 10.2–10.4 miles to access primary care,[21,22]highlighting that TNB populations often travel significant distances for healthcare, regardless of their geographic residence in urban or nonurban settings. Other data regarding travel distance for TNB populations is limited to services related to those living with HIV, demonstrating TNB populations travel greater distances for HIV care compared to cis populations,[17] or qualitative interviews indicating individual need to travel in order to access gender affirming services.[4]

Access is a major barrier to healthcare and represents a crucial determinant of health for patients of all identities.[23,24] Geographic location plays a large role in ability to seek healthcare, with rural communities facing more disparities in healthcare access when compared to urbanized settings.[25–27] However, factors other than geographic proximity may predict the need for TNB individuals to travel large distances for healthcare services. How individuals are treated in the healthcare system, characteristics of providers, and quality of care have been shown to impact accessibility.[23,24] For example, though rural TNB populations may need to travel further for healthcare than their urban counterparts, they are also more likely to be served by both primary and tertiary healthcare providers who use religious exemption laws to discriminate against TNB patients,[28] and who report broader negative perceptions of the transgender community at large.[29] Further, though the insurance landscape continues to change in the wake of the Affordable Care Act (ACA),[30–32] insurance access issues persist for many Americans by residence, with higher rates of uninsurance among nonurban residents when compared to other geographic areas.[33–35]

Despite accounting for at least 0.6% of the U.S. population,[36] there is limited work characterizing healthcare utilization patterns and health outcomes in TNB populations.[37] Those that do exist, have limitations including small sample sizes, and/or reliance on self-reported medical diagnoses.[38] Current research also tends to focus on urban coastal centers;[39] though, lack of access to gender-affirming care remains a primary concern for all TNB individuals,[1–3] regardless of where they call home. In order to better characterize and describe healthcare utilization patterns of TNB Coloradans who travel for gender-affirming healthcare, we systematically evaluated demographic characteristics, health insurance, substance use, mental health diagnosis, distance to care, and types of care accessed through the use of chart review for a large cohort of TNB individuals traveling from in and outside the Denver metro area accessing care at the county safety net hospital.

METHODS

The research setting is a vertically integrated county safety net healthcare system primarily serving Denver County in Colorado, with a central hospital and nine federally qualified health centers (FQHC). In 2017, the organization established an LGBTQ Center of Excellence. Its efforts included a decentralized model of care for TNB patients, where primary care providers in FQHCs were trained to provide comprehensive primary and gender-affirming care, including initiation and management of hormone therapy. Gender confirming surgical services were also expanded.

A cohort of TNB patients of all ages was selected for inclusion from the electronic medical record (EMR) by the presence of International Classification of Diseases, Tenth Revision (ICD-10) codes (F64.0) for gender dysphoria and/or self-reported TNB gender identity through sexual orientation/gender identity (SOGI) screening questionnaires administered to all patients in the EMR. Random chart review was conducted to ensure internal validity of cohort, assuring only TNB patients were included. Patients were excluded if they were cis (e.g., not identified as TNB) and if they never attended a medical visit after registration with a patient navigator.

Age, race/ethnicity, sex assigned at birth, gender identity, insurance type, and ZIP code of primary residence were collected for each patient in the cohort if recorded in their respective EMR. ZIP code of primary residence for the cohort was utilized to separate patients into two subgroups. One group included those residing in Denver County (n = 548) and in the Denver metro area (n = 450), including Adams County, Arapahoe County, Broomfield County, Boulder County, Clear Creek County, Douglas County, Elbert County, Gilpin County, Jefferson County, Park County. The second group (n = 232) included those outside the Denver metro area (non-Denver), which includes rural areas (defined as towns with population ≤2,500).[40]

Health measures evaluated for each subgroup in the cohort include prevalence of alcohol use disorder, tobacco use, marijuana use, depression, and anxiety. Alcohol use disorders were defined by the presence of a relevant ICD-10 diagnosis code, report in the EMR of drinking >2 standard drinks per day, or having ≥6 in a single occasion monthly or more.[41] This information is routinely gathered at all ambulatory and inpatient encounters at the study site. Patients not meeting these criteria were classified as having no alcohol use disorder, though this includes patients who may abstain from drinking and those who drink in moderation. Tobacco use was defined as the presence of an ICD-10 code for tobacco or nicotine use disorder or designation as a current smoker in the EMR; tobacco nonuse was defined as the absence of these markers. Marijuana use was identified through reported use in the EMR; marijuana nonuse was defined as the absence of this marker. Depression and anxiety were identified by the presence of relevant ICD-10 code(s) in the EMR. In the absence of these ICD-10 codes, patients in each cohort were coded as having no depression or anxiety.

The mean distance traveled by patients for care was calculated from the driving distance of the nine-digit ZIP code of primary residence to the address of the health system hospital address utilizing the following website: https://www.mapdevelopers.com/distance_from_to.php. Statistical analysis included odds ratios (OR) with 95% confidence intervals (CI) and Chi-square test for statistically significant differences of characteristics and condition prevalence between subgroups. Independent *t* testing was used to compare mean distances traveled between cohorts. Microsoft Excel (Microsoft Corporation) and SAS (SAS Institute) were used for statistical analyses in this study. Significance level for all statistical analyses was set at $p < .05$.

Chart review was then conducted among the cohort of non-Denver TNB patients receiving services, which characterized patterns of utilization in order to determine what types of services were being provided. Gender-affirming care was defined as any medical care directly associated with a diagnosis of gender dysphoria (F64.0) or specific reference to a patient's gender identity in documented notes that affirmed their self-described gender identity, preferred name, and pronouns. Hormone-related care included patients prescribed hormone replacement therapy by a provider at the study site and excluded those receiving hormone-related care by a provider outside the study site. Surgical-related care was defined as undergoing any kind of gender-affirming procedure by a provider within the study site health system; this excluded patients with historical procedures from providers in other states or countries. Comprehensive care included patients with an assigned primary care provider within the study site health system and patients without an assigned provider who repeatedly accessed care for a chronic medical condition (e.g., asthma, anxiety, tobacco use disorder). Preventive care was defined by receiving any vaccination or other preventive care services as defined by United States Preventive Services Task Force (USPSTF) Guidelines and University of California, San Francisco (UCSF) Center of Excellence for Transgender Health Guidelines.[42,43]

This project was reviewed by the Quality Improvement Committee of Denver Health (QuIRC), which has been endorsed by the Colorado Multiple Institutional Review Board at the University of [MASKED]. The QuIRC has determined that this project does not constitute human subjects research.

RESULTS

A total of 1,250 TNB patients were initially identified. Twenty patients were excluded who were initially registered in the EMR but never attended a medical visit, resulting in a total of 1,230 patients included in the analysis.

The demographic profiles of the study cohort are summarized in Table 1. There were missing characteristic data from the EMR among both cohorts for sex assigned at birth, gender identity, race/ethnicity, and health insurance, though distributions of these missing data between Denver and non-Denver cohorts were similar. There were more transgender women represented in the sample than other gender identities, though non-Denver TNB patients comprise a cohort that includes more transgender men than Denver TNB patients. Denver TNB patients were more likely to be black or Hispanic compared to non-Denver TNB patients, who were more likely to be white ($p = .0136$). Denver TNB patients comprised a group that included more youth <18 years and middle-age adults 25–44 years, while non-Denver TNB patients included more young adults 18–24 years. Non-Denver TNB patients had higher rates of Medicaid ($p = .0158$) coverage and lower rates of commercial insurance ($p = .0085$). There were no significant differences in Medicare or uninsured rates when compared to Denver TNB patients. Forty-three TNB patients traveled from areas explicitly defined as nonurban and rural (towns with population ≤2,500) and represent a cohort that were more likely to be white, young adults.

TABLE 1. TNB Demographic Profiles by Distance to Care

Characteristic	Non-Denver *n* = 232 (18.9%)	Denver *n* = 998 (81.1%)	*P*	Total *n* = 1,230 (100%)
Sex assigned at birth	229	982	.0767	1,211
Female	94 (41.0)	402 (40.9)		496 (41.0)
Male	124 (54.1)	488 (49.7)		612 (50.5)
Other/Unknown	14 (6.1)	108 (11.0)		122 (10.1)
Gender identity	222	921	.6326	1,143
Female	35 (15.8)	133 (14.4)		168 (14.7)
Male	22 (9.9)	105 (10.7)		127 (11.1)
Transgender female	86 (38.7)	346 (37.6)		432 (37.8)
Transgender male	65 (29.3)	83 (9.0)		148 (12.9)
Other/unknown	14 (6.3)	87 (9.4)		101 (8.8)
Race/Ethnicity	198	866	.0136*	1,064
Black	10 (5.1)	57 (6.6)		67 (6.3)
White	148 (74.7)	595 (68.7)		743 (69.8)
Hispanic	30 (15.2)	170 (19.6)		200 (18.8)
Other/unknown	10 (5.1)	44 (5.1)		54 (5.1)
Age, years	232	998	.1071	1,230
<18	17 (7.3)	104 (10.4)		121 (9.8)
18–24	83 (35.8)	262 (26.3)		345 (28.0)
25–34	86 (37.1)	395 (39.6)		481 (39.1)
35–44	22 (9.5)	129 (12.9)		151 (12.3)
45–54	11 (4.7)	54 (5.4)		65 (5.3)
55–64	7 (3.0)	33 (3.3)		40 (3.3)
65+	6 (2.6)	21 (2.1)		27 (2.2)
Health insurance	229	952	.0099*	1.181
Uninsured	1 (0.4)	14 (1.5)		15 (1.3)
Medicare	12 (5.2)	30 (3.2)		42 (3.6)
Medicaid	89 (38.9)	291 (30.6)		380 (32.2)
Commercial	127 (55.5)	617 (64.8)		744 (63.0)

*$p < .05$.

These 43 individuals were included within the non-Denver cohort and were not analyzed as a separate cohort due to lack of power.

Differences in distance traveled to care (one-way) between Denver and non-Denver TNB patients are presented in Figure 1. Among patients with in-state ZIP codes, the range of distances traveled were from 0.71 miles to 353.41 miles, with a mean total distance traveled of 24.64 miles (standard deviation [*SD*] = 37.22). Non-Denver TNB people traveled a significantly longer mean distance ($t_{1,228} = 39.27$, $p < .001$) of 82.52 miles (*SD* = 54.35) when compared to Denver TNB, who traveled a mean distance of 11.39 miles (*SD* = 9.13). For patients

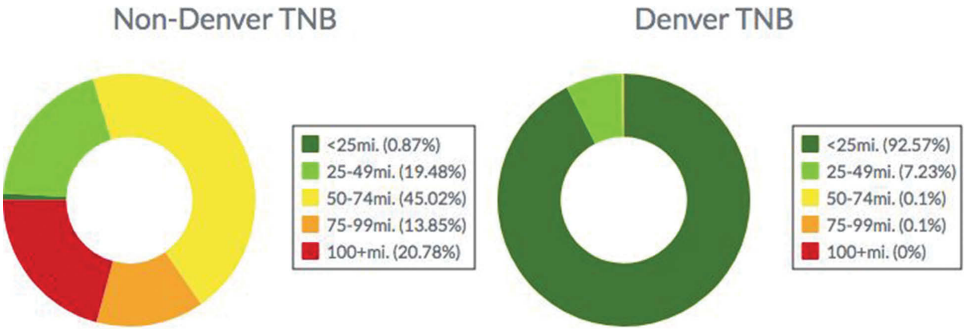

Figure 1. Miles traveled to care for non-Denver and Denver TNB patients.

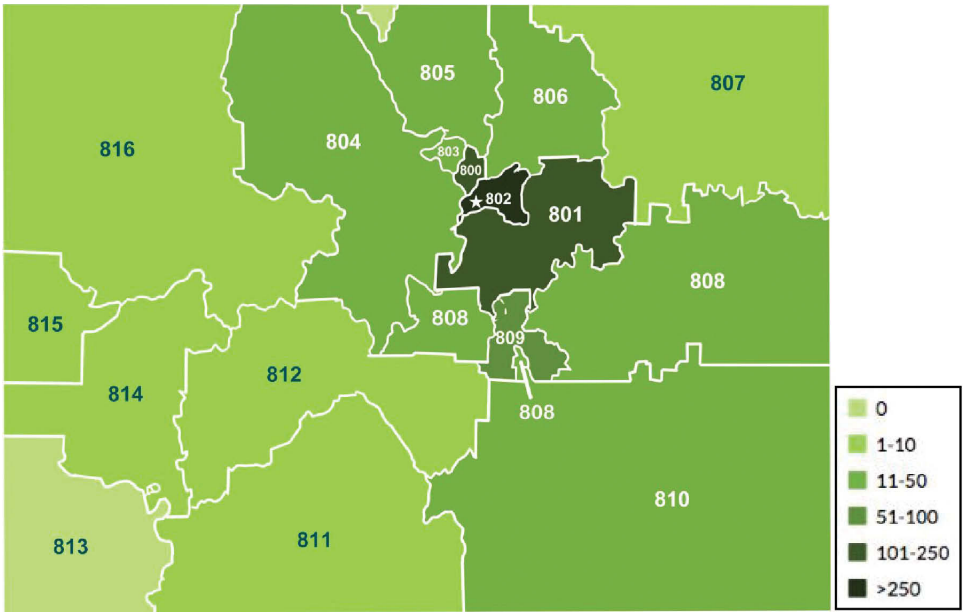

Figure 2. Colorado map of TNB patient density by three-digit ZIP code. Star denotes hospital location.

with out-of-state ZIP codes, the range of distances traveled were from 121.90 miles to 1,901.94 miles, with a mean total distance traveled being 811.39 miles (*SD* = 559.78). These 30 out-of-state individuals were excluded from Figure 1 and distance traveled analyses to assure that representation of in-state travel distance was not overestimated by these outliers. Density mapping of TNB patients included in the study is shown in Figure 2, based on three-digit ZIP Code Tabulation Areas (ZCTA) from the U.S. Census Bureau.

Differences in mental health and substance use outcomes by distance to care are described in Table 2. Denver TNB were found to be at increased odds of diagnosis with anxiety or depression when compared to the reference group, non-Denver TNB (OR 1.831, p = .0004, 95% CI [1.30-2.57]; OR 1.773, p = .0002, 95% CI [1.32–2.39]). Denver TNB were also found to have an increased odds of documented marijuana use than their non-Denver counterparts (OR 1.411, p = .0229, 95% CI [1.05–1.90]). There were no differences between alcohol use disorder and tobacco use among Denver and non-Denver groups.

TABLE 2. TNB Patient Mental Health and Substance Use by Distance to Care

Condition	Non-Denver[a] *n* = 232 (18.9%)	Denver *n* = 998 (81.1%)	*p*	Total *n* = 1,230 (100%)	OR (95% CI)
Mental health					
Anxiety	50 (21.6)	334 (33.5)	.0004*	384 (31.2)	1.831 (1.30–2.57)
No anxiety	182 (78.4)	664 (66.5)		846 (68.8)	
Depression	79 (34.1)	477 (47.8)	.0002*	556 (45.2)	1.7731 (1.32-2.39)
No depression	153 (65.9)	521 (52.2)		674 (54.8)	
Substance use					
Tobacco use	67 (28.9)	297 (29.8)	.7913	364 (29.6)	1.0434 (0.76–1.43)
Tobacco nonuse	165 (71.1)	701 (70.2)		866 (70.4)	
Marijuana use	81 (34.9)	430 (43.1)	.0229*	511 (41.5)	1.4113 (1.05–1.90)
Marijuana nonuse	151 (65.1)	568 (56.9)		719 (58.5)	
Alcohol use disorder	3 (1.3)	28 (2.8)	.1855	31 (2.5)	2.2034 (0.66–7.31)
No alcohol use disorder	229 (98.7)	970 (97.2)		1,199 (97.5)	

Abbreviations: CI = confidence interval; OR = odds ratio.
[a]reference group.
*$p < .05$.

Access patterns among non-Denver TNB patients receiving medical care at our institution are described in Figure 3. Nearly all patients received some type of gender-affirming care, including 81% who had hormone-related care. More than two-thirds of these patients also accessed comprehensive primary care and preventive care services. Less than one-quarter of these patients accessed gender-affirming surgical care. However, an additional 106 non-Denver TNB patients (45.69%) are currently on the surgery waitlist at our institution, making the number who have received surgical care in Figure 3 a representation of surgeries performed rather than those planned. Among this cohort, 14 patients were provided hormone-related care from providers outside the study site, and seven patients had reported a prior gender-affirming surgical procedure from an outside hospital.

DISCUSSION

To our knowledge, this is the first study evaluating patient characteristics, travel distances and patterns of healthcare utilization for TNB people in Colorado who travel for healthcare. Denver TNB patients were more likely to be black or Hispanic compared to non-Denver TNB patients, but this is confounded by poor data field entry regarding race/ethnicity into the EMR,

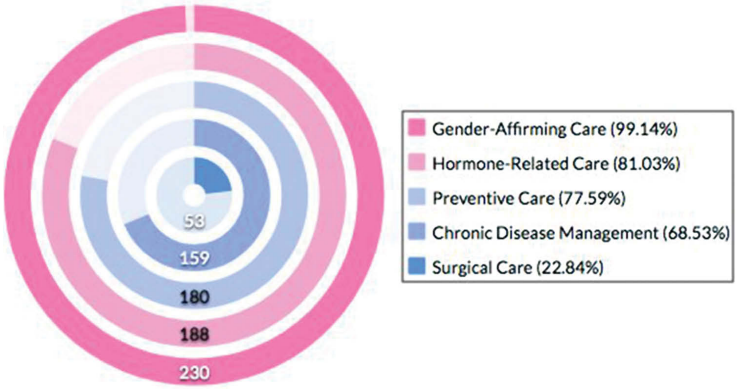

Figure 3. Healthcare access patterns among Non-Denver TNB patients (n = 232).

as well as lack of appropriate options for multiracial people, leading to a higher percentage of people being categorized as "other/unknown." Alternatively, this may reflect general trends of a higher percentage of white people residing in rural areas or smaller towns,[44] or greater barriers to transportation for longer travel distances for people of color.[45] Both groups trended toward younger ages, with >90% under the age of 45 years old. It is possible that older people have greater barriers to traveling for care,[45] and/or may not engage in care due to historical stigma that may not reflect current trends toward LGBTQ inclusivity in the healthcare environment. Of note, this young age demographic of TNB patients may access healthcare services differently relative to their age-matched peers, as has been shown among college LGBQ students.[46] Education status is not reliably and systematically collected in our EMR, and was thus outside the scope of the project as an analysis variable.

The non-Denver TNB cohort had higher rates of Medicaid coverage, lower rates of commercial insurance and no difference in uninsured rates when compared to the Denver TNB cohort (p = .0099). This contrasts with literature in other fields demonstrating that patients with private insurance travel further for care than those with public insurance.[17,47] It may be that non-Denver TNB patients with public insurance have a more difficult time finding a knowledgeable local provider who provides gender-affirming care and accepts their insurance. Additionally, they may access care more easily at a safety net institution that is incentivized to see patients with public insurance and advertises gender affirming care. Of note, Colorado Medicaid covers hormone therapy and most gender-affirming surgeries; this may be an important factor in willingness to travel long distances for care. Certainly, this could be different in states that do not cover gender-affirming care under Medicaid, which may limit the generalizability of the results in this study. The intersections of insurance type with local, in-network provider expertise represent a major barrier in access for TNB people; this may be a primary motivating factor for long-distance travel to receive care.[48] The federal landscape also complicates TNB healthcare coverage protections, with recent rollback of ACA protections demonstrating the evolving nature of barriers to healthcare access among members of this community.[49]

We found that nearly 20% of a large cohort of 1,230 TNB people receiving care at the Denver county safety net system reside outside the county, and are traveling a mean distance of 82.52 miles (*SD* 54.35) one-way to receive care. Less than 45 patients reside in rural towns, and the rest are centered in larger towns and cities that, in general, have a greater concentration of medical facilities and services. This indicates that proximity may not be the primary motivation

in selection of a medical provider or organization, which suggests that a number of other factors, such as knowledge, resources, and availability of alternate providers, may cause patients to bypass more geographically convenient services.[50] Based on prior theories of access,[51] we propose two hypotheses to explain this pattern of bypassing geographically proximal care by TNB people: (1) services sought are not available due to lack of provider knowledge, unavailability of surgical services, and/or insurance barriers to service access; or (2) low satisfaction with services that are available, possibly due to inadequate and/or inferior quality or experiences of stigma in the healthcare setting. These hypotheses are supported by national survey data indicating that up to 50% of TNB people report having to teach their medical providers how to take care of them, and 25% experience discrimination in healthcare settings.[8] The negative impacts of long travel distances to access healthcare include travel time and cost, and potential delays in care.

Denver TNB residents had higher rates of anxiety, depression, and regular marijuana use compared to non-Denver TNB people, but no other statistically significant differences in alcohol use disorder or tobacco use were identified. This could reflect a higher functional level of mental health of those traveling for their healthcare, skewing the non-Denver TNB cohort toward greater mental health. Those with a higher mental health or substance use disorder burden may have additional emotional or financial burdens that limit their ability to travel long distances for healthcare. There may also be increased barriers to accessing mental healthcare in rural areas, with these communities reporting lack of privacy, lack of culturally appropriate treatments, lack of available facilities or Internet access, and lack of providers available via telehealth.[52] Alternatively, non-Denver TNB traveling to access gender-affirming care may under-report these conditions for fear of providers withholding care based on mental health diagnoses, a gate-keeping practice that has historically faced this community. For urban dwellers, there may also be greater access to mental healthcare and increased stressors of urban life such as higher cost of living, housing instability, and so forth. The higher rates of marijuana use for Denver residents could be reflective of self-medication for the higher rates of anxiety disorders, or simply represent greater access with a higher density of dispensaries given that recreational marijuana is legal in Colorado. Of note, there are cities in the state that do not allow the sale of marijuana within city limits,[53] which could restrict access for non-Denver TNB people.

Thorough chart review revealed that the majority of non-Denver patients received gender-affirming care, hormone-related care, preventive care, and chronic disease management. While access to gender-affirming care may be the primary motivation to seek care at our institution, our decentralized model of access to gender-affirming care embedded within primary care allows TNB patients to engage in chronic disease management and preventive care at their visits. TNB people across the United States, including Colorado, report a lower likelihood of having a primary care provider and high rates of delaying preventive healthcare due to previous discriminatory experiences.[4,12] More research is needed to evaluate different models of care for TNB communities, especially with regards to addressing comprehensive healthcare needs outside of gender-affirming hormone therapy or surgeries. Patterns of healthcare utilization in this study, however, suggest that decentralized models of access to gender-affirming care may enable increased engagement in preventive care and chronic disease management for TNB people.

A major strength of this study includes use of the EMR to systematically evaluate this patient cohort by ICD-10 codes and history entered by medical staff and providers, which is more suited to objectively studying condition prevalence compared to self-report.[54] Chart review was utilized to assess the validity of the data set and determine what services were being sought for those traveling for care, with attention to gender-affirming care, transitional surgery care,

and chronic and preventive healthcare services. Additionally, the study setting in a safety-net hospital system in the Mountain West evaluated patients who are historically underrepresented in the medical literature.

Study limitations include low numbers of patients residing in rural areas and lack of statistical power to perform subanalyses for this group. The study focuses on patients linked to and engaged in medical care and thus does not evaluate those who are not seeking care or have major barriers to doing so. Retrospective EMR data review is limited by the accuracy of the data that is entered, which does not allow for elucidation of patient-centered priorities and barriers to care. Methods used to approximate distance to care may underestimate actual distance traveled due to use of ZIP codes rather than door-to-door distance and does not reflect the burden of time that it may take to travel based on transportation options available. Lastly, two of the study authors are cis, and one is transgender. This research topic was chosen by the authors, not in direct collaboration with community members.

Additional research is needed in this field, including: evaluations between travel distance and health outcomes for TNB people; exploration of the underlying reasons why TNB patients travel for care and how they identify care providers; how healthcare utilization changes over time, especially as compared to people who do not travel for care; optimal solutions for overcoming access barriers in low-resources areas; and, the unique needs of TNB people in rural areas.

CONCLUSIONS

Our study findings suggest that proximity to care may not be the most important factor for TNB people when seeking a provider. Positive healthcare experiences reported by TNB people most commonly include provider knowledge and respect for sociocultural needs, as well as welcoming environments and integration of care, without mention of distance traveled or resulting health outcomes.[9] Conversely, absence of any of the aforementioned characteristics of access could lead TNB individuals to bypass more geographically convenient healthcare services. The large number of patients traveling for care may reflect a lack of accessible gender-affirming care locally, which should be a call to medical providers to seek out training to be able to meet the needs of TNB patients in their communities. Additionally, medical educators should improve teaching on gender-affirming healthcare, particularly for educational tracks focused on rural healthcare delivery. Given extensive health disparities that exist and frequent experiences of discrimination in the healthcare system among TNB communities, it is crucial to broaden the definition of healthcare access when analyzing barriers that TNB patients face. A more complex analysis of access and barriers to healthcare for TNB communities is required in order to ultimately achieve equitable solutions and improved health outcomes.

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